A NEW ALGORITHM ON SOC ON VARIOUS PLATFORMS FOR VEHICLES

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Abstract

Due to the rise in development of semiconductor technology it is possible to design the complete system on a single chip, which is called as ''System on chip". In this paper the designing of the proposed system will be done which controls the various functions in the vehicle. The system on chip is the powerful method to implement embedded system which will consist of controller, memory, I/O peripheral. The implementation of the proposed system will be done using XILINX FPGA platform and the verification of the functionality of the proposed system will be done using ISIM simulator.

1. INTRODUCTION

Nowadays the vehicle use is very common. Vehicle is a hybrid system wherein many operations such as wiper control, fading of vision due to fog etc., are being controlled by different individual controllers. There are many systems that have been designed based on microcontrollers and different sensors for the defined specific application. These systems are quite complex. So constructing a system comprising of single chip which is capable of controlling multiple function will make the system simple, efficient and user friendly.

System on chip is nothing but the integration of all the components or the other electronic system on a one chip. It is a gathering of different components of a system on to a one chip. Due to the use of SOC system performance increases, processing technology becomes good, the circuit area reduces, and it also gives efficient battery life time, the SOC is cost sensitive.

The Programmable semiconductor devices that are based around a matrix of Configuration logic blocks connected by a programmable interconnect is known as "FPGA". In Application specific Integrated circuits the device is custom built for particular design. But in case of FPGA, it can be programmed as per the demand of the application or as per the required functionality. Due the use of FPGA the cost associated with the redesigning or updating the system manually will be eliminated. In FPGA the field upgrades is completed remotely.

2. LITERATURE REVIEW

1. V. Usha Rani, et.all[1], In this paper the module is designed to control the ventilation process autonomously in order to utilize vehicle comfortably. i.e. it provides conditions that helps to enter into the vehicle parked in the sun more comfortably. For the controlling action PIC microcontroller is used.

2. FazelElahiet. al[2], Windshield control is one of the important operations of driver at the time of driving. In the windscreen the mountings are fitted which are very essential for driving without any problem. To control the windshield sensors and microcontroller are used. In this paper a system is developed which controls the windshield and gives the comfortable and flexible driving to the human. Water level sensor controls the movement of the wiper by sensing the water level or rain. Dust sensor is also implemented here which causes to flow some water in the

windscreen and clean it. The dust sensor senses the dust onto the screen. In this project the sun visor is also mounted inside the car which is used to protect the eye of the driver from the sun and this is control by the servo motor. Here the automatic sun visor is produced which is controlled by a light sensor which is used to control the light intensity and transfer the control signal to the main control unit. The project is designed to improve human comfort in the present system which is useful for driver for concentrating on his driving. 3. MukulJoshi,et.al

[3], In this paper, they have designed an automatic wiper controller, the controlling action is depend on resistive rain sensor. This sensor is effective in cost, works efficiently and gives a maximum range of output. In this paper they developed an corresponding electrical and mathematical model of the sensor, simulation and verification of the same is also done. As the rain sensor has the set geometry, the rain water forms a layer on the surface of the sensor due to which the resistance changes nonlinearly. The overall efficiency of the system can be increased by linearizing the sensor response. The linear response can be obtained by using the electrical equivalent model of the sensor and by suitable linearization circuit. A PIC microcontroller is used to design a system to achieve variation in motor speed depending on the output of the sensor.

4. Rajesvari.R1, et.al [4], In this paper the telecomm and the system is designed which convey the signal from the station present at the surface of the earth to the space station. This is obtained by integrating the SRAM, ARM processor, EDAC unit, CCSDC unit. In this paper by using VHDL code the telecommand SOC is designed. For implementation of the system XILINX FPGA platform is used and for verification of the functionality Modelsim is used. In this paper they have used a telecommandSystemon-a-Chip (SoC) for implementation of an On-Board System (OBS) of a small Satellite. The system on chip was build by writing soft intellectual property in hardware description language (VHDL.) The final subsystem is obtained by the integration of SRAM, ARM PROCESSOR, Error Detection and Correction Unit and CCSDS Decoder was designed.

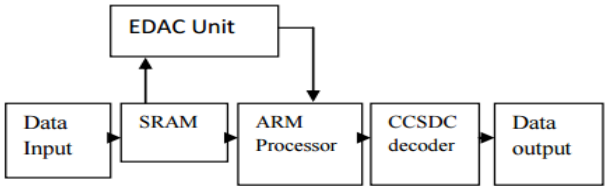


Fig. 1 Block diagram of SOC design

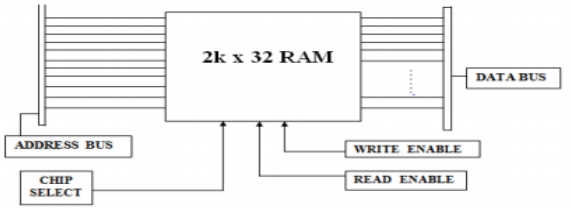


Fig. 2 Block Diagram Of 2K * 32 bit SRAM

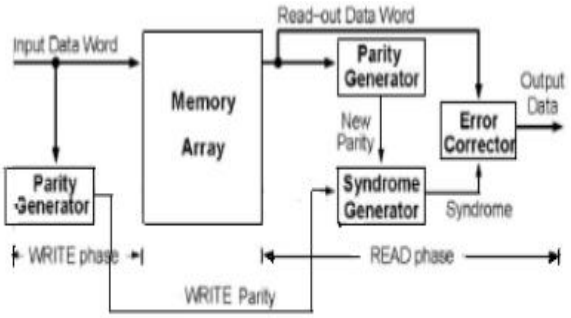


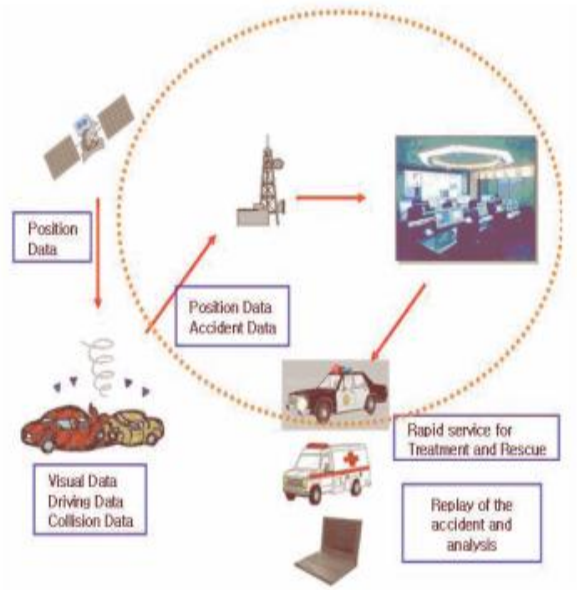
Fig. 3 Integration of SRAM with EDAC unit

5. Mr. TR. Parthasarthy [5] et.al, In this paper on performance characteristic the partitioning between ARM and FPGA is discussed.

6. DaeGeun Lee, et.al [6] proposed the design of Embedded Controller for Car Black Box. Here the SOC

design of the embedded controller is done by combination and confirmation of each 8051 core IP, CAN controller, SD controller and JPEG compressor and other components. The implementation of the system which is designed for the car black box has been done on FPGA. The verification of the test board system is also done.

Fig 4. Concept diagram:



The car black box is used to detect various information such as driving data, data of collision and the data of previous position of the vehicle and the position of vehicle after the accident. This information will be useful to examine the accident easily and to solve the problems associated with car accident.

7. Huang Jin et .al [7], In this paper the author discussed structural design of embedded DRAM and its prototype implementation. The circuit contains more than one memory banks with a row buffer which is used to hold the subdivision of newly accessed rows. The memory banks used here use the adjacent or interleaved addressing. The direct mapping can be used by the row buffer in each bank for mapping rows from the DRAM array into the buffer. A write bypass feature is also supported for the row buffer. A VHDL is used for prototype memory bank implementation for programmable logic chip using embedded SRAM memory blocks to emulate a DRAM array

3. CONCLUSIONS

It is concluded that the controlling action in the vehicle is done with the help of different type of controller. The SOC is also designed for the different application. The system proposed here Will be designed which controls the various functions in the vehicle. The powerful method for implementing embedded system is SOC which will consist of controller, memory, I/O peripheral. The implementation of the proposed system will be done using XILINX FPGA platform and the Verification of the proposed system will be done using ISIM simulator.

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